Evaluation of Thoracic Radiographs in Canine HW Disease

Luigi Venco DVM, SCPA, EVPC Dipl.
Two views

- Latero-lateral (right recumbency)
- Sagittal (dorso-ventral strongly advised)
Dog positioning

- Sagittal plane of the thorax parallel to the film and perpendicular to the X ray beam
- Center of the X-ray beam centered on the heart

*to avoid distortion of cardiac silhouette*
Dog positioning

Wrong

Correct
HW disease in DOGS  Pathogenesis

• Chronic disease
• Damages first at the pulmonary parenchyma and arterial vessels
• Right cardiac chambers dilatation only in the late stage of the disease and when parenchymal and arterial diseases are present only

Radiographic right cardiac chambers enlargement not associated to pulmonary arteries enlargement is not consistent with HW disease
HW disease in DOGS  Pathogenesis

- No lesions
- Inflammatory pulmonary disease
- Arterial pulmonary disease \((\text{pulmonary hypertension, “cor pulmonale”})\)
- Right heart congestive failure

Months/Years
Thoracic radiographs  
Tool for obtaining information about

- **Pulmonary parenchimal disease**
- **Pulmonary arterial disease**

Less important

- Right cardiac chambers (cardiac silhouette)
- Pulmonary venous circulation (in case of left cardiac side concurrent diseases i.e. Mitral insufficiency or DCM)
No indications about worm burden

Normal thoracic radiographs may be associated to recent infections with high worm burden and severe radiographic changes may be associated to long lasting infections with exhausted worm burden
Over the time, during the infection, the worm burden is reducing due to the spontaneous death of the parasites that, causing thromboembolism, worsen the radiographic picture.
Venco L et al. *Relative utility of Echocardiography, Radiography, Serologic testing and Microfilariae counts to Predict Adult Worm Burden in Dogs Naturally Infected with Heartworms.*

Recent Advances in Heartworm Disease. Symposium ’01.

**Middle-aged dogs usually have high worm burden without severe radiographic changes.**

**Older dogs rather severe radiographic abnormalities with reduced worm burden**
Radiographic landmarks for canine HW disease (angiography)
Radiographic landmarks for canine HW disease (anatomy)
Radiographic landmarks for canine HW disease (anatomy)
QUESTIONS to be answered when evaluating Thoracic radiographies in a HW infected dog

- Is pulmonary parenchyma damaged?
- Are pulmonary arteries enlarged?
- Is cardiac silhouette modified?
- If yes what about right cardiac chambers?
- Are signs of right cardiac congestive failure present?
No obvious lesions (recent infection)
Pulmonary interstitial pattern and mild enlargement of cranial pulmonary arteries
Clear enlargement of cranial pulmonary arteries
Mixed interstitial-alveolar pattern of the caudal lung lobes
Severe enlargement of the main and cranial pulmonary arteries
Interstitial pattern of the caudal lung lobes
Severe enlargement of cranial pulmonary arteries and pulmonary trunk
Right ventricle enlargement
Severe enlargement of the arterial pulmonary vessels and «pruning» of the right pulmonary artery (arrows)
Mixed interstitial-alveolar pattern of the caudal lung lobes
Severe enlargement of cranial pulmonary arteries
Right ventricle enlargement with the heart apex displaced dorsally
Mixed interstitial-alveolar pattern of caudal lung lobes, and reduced flow to cranial lobes
Severe enlargement of cranial pulmonary arteries
Right ventricle enlargement with the heart apex displaced dorsally
Mixed interstitial-alveolar pattern of caudal lung lobes.
Severe enlargement of cranial pulmonary arteries.
Trachea displaced dorsally by right atrium enlargement. Pleural effusion
Bulging of the main pulmonary artery
Severe enlargement of caudal pulmonary arteries.
Cross breed F
8 year old 14 kg

Main pulmonary artery
Interstitial pattern caudal lung lobes
Right pulmonary artery
Cranial pulmonary artery
Self assessment
Cross breed Male 4 year old 12 kg
Estimate radiographic changes and worm burden
Results

Thoracic radiograph evaluation

• No radiographic changes

HW surgically removed
Self assessment

Estimate radiographic changes related to HW disease
Caudal lung lobes interstitial pattern
Dilated main pulmonary artery
Dilated cranial pulmonary arteries

Dilated main pulmonary artery
Dilated caudal pulmonary arteries
Pruning right caudal pulmonary artery
Dilated right ventricle (reversed D shape)
ESDA
European Society of Dirofilariosis and Angiostrongylosis